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# Absence of Skin of Colour Images in Publications of COVID-19 Skin Manifestations

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Dear Editor, There are now over 1 million confirmed cases of COVID-19 globally with more than 270,000 recorded deaths to date.[1] COVID-19 has been shown to disproportionately impact people of colour both in the United Kingdom and in the United States where blacks make up 13.4% of the population but 30% of COVID-19 cases.[2,3] Mounting evidence shows that COVID-19 impacts several organ systems, including the skin.[4] Knowledge of cutaneous manifestations of COVID-19 and ability to identify them in patients of all skin types is important for dermatologists and other healthcare providers who may be evaluating patients who are otherwise asymptomatic. In order to provide optimal care to all patients, it is therefore important that we are able to identify cutaneous manifestations of COVID-19 in patients with darker skin.

We completed a systematic literature review of all articles describing cases of cutaneous manifestations associated with COVID-19 using PRISMA guidelines. We included English-language articles published between December 31st, 2019 and May 3rd, 2020. We extracted patient case numbers, race and ethnicity descriptors when available, photographs, and descriptions of cutaneous manifestations. In order to assess background skin color, a board-certified dermatologist with expertise in diagnosing and treating patients with skin of colour (Fitzpatrick type IV-VI) evaluated each of the images and categorised them based on Fitzpatrick type I-VI.

We collated these images, ordered by skin type (Figure 1, panel A). We then manually selected a pixel of background skin, unaffected by the rash, from each image. In order to adjust for lighting conditions, we then standardized the Lightness portion of the HSL scale of this pixel within each coded Fitzpatrick category, thus approximating true skin color (Figure 1, panel B). We obtained permission to show 116 of 130 images in Figure 1.

Forty-six articles met inclusion criteria. Of those, 36 articles included clinical photos of COVID-19 related skin lesions for a total of 130 images. Ninety-two percent (120/130) showed skin types I-III, 6% (7/130) showed patients with type IV skin, and 2% (3/130) could not be classified because they depicted only acral skin. There were no clinical images representing Fitzpatrick type V or VI skin. Photographed eruptions among Fitzpatrick phototypes I-III included chilblain-like, urticarial, maculopapular, and vesicular lesions. The images among patients with Fitzpatrick phototype IV included chilblain-like lesions and necrotic purpura only. Among the 6 articles with race and ethnicity information, 91% of the patients mentioned were reported to be white and 9% were Hispanic.

Our analysis demonstrates that articles describing the cutaneous manifestations of COVID-19 almost exclusively show clinical images from patients with lighter skin. Based on our analysis, there are no published photos of the cutaneous manifestations in dark skin (Fitzpatrick type V or VI). This is a problem because skin disease often presents differently in skin of colour.[5] We have previously reported imbalances in representation of Fitzpatrick skin types in dermatology textbooks[7] and in dermatology journals.[6,7] This can lead to cognitive biases that can also impact differential diagnoses and physician-patient relationships.[6]

Forty-seven percent of dermatologists report insufficient exposure to patients with darker skin during their training and this directly impacts quality of patient care.[6,8] One way to mitigate this deficiency is to increase the availability of images in teaching materials and dermatologic journals.[8] We will not be able to attain this goal without an explicit commitment to documenting, photographing, and publishing the manifestations of this disease in a wide variety of skin tones. Our study is limited by the subjective assessment of skin type from a photograph. Lighting conditions including overexposure may have made dark skin look lighter, and this may have led to some misclassification across 1 or 2 skin types. However, it is unlikely that lighting issues alone would result in skin types V or VI appearing as skin type I-III.

The paucity of images of skin manifestations of COVID-19 in patients with darker skin is a problem, because it may make identification of COVID-19 presenting with cutaneous

manifestations more difficult for both dermatologists and the public. Given the racial disparities in COVID-19 infections and associated deaths, it is important that all manifestations of this disease contain broad representation of people of different races and ethnicities, as any clue, if recognised, could contribute to early diagnosis and potentially better health outcomes.

Dermatologists should prioritise identification of cutaneous manifestations of COVID-19 in patients with darker skin by photographing and disseminating these findings. Journals should prioritise publication of manuscripts depicting the cutaneous manifestations of COVID-19 in darker skin because exclusion of these patients from the literature may further exacerbate existing health disparities.

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Figure 1, panel A (116 images)

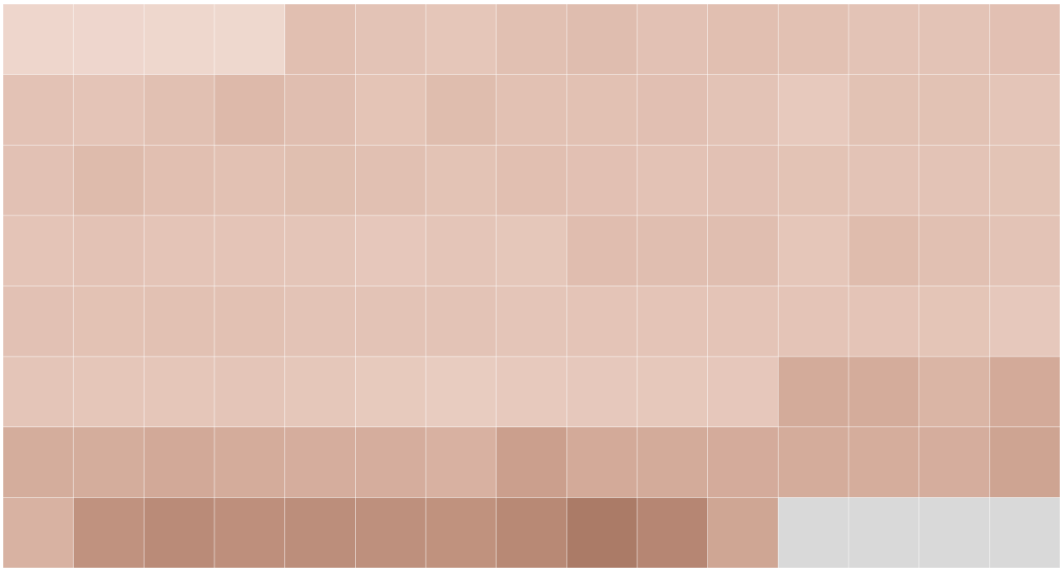

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Figure 1, panel B (116 images)